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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/522,104	01/24/2005	Garrick Ross Johnson	NW0970US (#90586)	9495
28672	7590	10/10/2006	EXAMINER	
D. PETER HOCHBERG CO. L.P.A.			STEPHENSON, DANIEL P	
1940 EAST 6TH STREET			ART UNIT	
CLEVELAND, OH 44114			PAPER NUMBER	

3672

DATE MAILED: 10/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/522,104	<b>Applicant(s)</b> JOHNSON, GARRICK ROSS	
	<b>Examiner</b> Daniel P. Stephenson	<b>Art Unit</b> 3672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 5-11 is/are rejected.
- 7) ☒ Claim(s) 3 and 4 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                               | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                      | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The references cited in the Search Report by the Australian Patent Office on 18 November 2003 have been considered, but will not be listed on any patent resulting from this application because they were not provided on a separate list in compliance with 37 CFR 1.98(a)(1). In order to have the references printed on such resulting patent, a separate listing, preferably on a PTO/SB/08A and 08B form, must be filed within the set period for reply to this Office action.
2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. Claims 1, 2, 5-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over DuBois 5,806,608 in view of Bouyoucos et al. 6,378,951. Dubois discloses (figures 5,6) discloses an apparatus for generating sinusoidal pressure waves for application to a mandrel. The apparatus

Art Unit: 3672

includes a cylinder (32) including a chamber that has a bore (44), a 360° inlet gallery (48) and two exhaust galleries (50,52). There is a work piston (24) adapted to have reciprocal movement in the bore of the chamber and having a radial wall that will seal against the wall of the bore of the chamber during its reciprocal movement within the chamber. The work piston has a first land (top of 24) at one end of the work piston and a second land (bottom of 24) at the second end of the work piston. There are fluid channels (66, 64) to alternately duct fluid under pressure from the inlet gallery into the bore of the cylinder above the first land of the work piston and be exhausted from the bore below the second land of the piston into the exhaust gallery to move the work piston within the bore, and to duct fluid under pressure from the inlet gallery into the bore of the cylinder below the second land of the work piston and be exhausted from the bore above the first land of the piston into the exhaust gallery to reciprocate the piston within the bore. The inlet gallery of the piston has an inlet port to enable pressurized fluid to enter the gallery. The inlet gallery communicating with the bore of the cylinder through a port (41) that terminates at the surface of the wall of the bore. The body of the work piston has a first and second transfer gallery (68, 72) extending longitudinally through the body and communicating through the radial wall of the work piston with said inlet gallery for a predetermined time during the reciprocating movement of the work piston. They also communicate with the bore of the cylinder through the first and second radial faces of the work piston. The chamber includes two exhaust galleries (50,52). The first exhaust gallery communicates with the cylinder chamber above the first radial face of the work piston. The second exhaust gallery communicates with the bore of the cylinder below the second radial face of the work piston. The first and second exhaust galleries include outlet ports to enable fluid within the galleries to be ducted away from the bore of the cylinder.

Art Unit: 3672

The location of the opening of the first transfer gallery in the radial wall of the work piston is offset longitudinally to the opening of the second transfer gallery in the radial wall of the work piston.

Dubois does not disclose a piston shaft connected to the work piston and adapted to transmit the forces generated by the reciprocating motion of the piston to a mandrel. Nor does it disclose that a rig supports the cylinder and the work piston includes a piston shaft which is connectable to the mandrel. Nor does it disclose that the cylinder chamber forms part of a drill head that includes a ballast weight.

Bouyoucos et al. (figure 6) discloses an apparatus for generating sinusoidal pressure waves for application to a mandrel (66). The apparatus includes a cylinder (64) including a chamber which has a bore (68,70). There is a work piston (62) adapted to have reciprocal movement in the bore of the chamber and having a radial wall which will seal against the wall of the bore of the chamber during its reciprocal movement within the chamber. The work piston has a first land at one end of the work piston and a second land at the second end of the work piston. There is a piston shaft connected to the work piston and adapted to transmit the forces generated by the reciprocating motion of the piston to a mandrel (66). A rig (60) supports the cylinder. The cylinder chamber forms part of a drill head that includes a ballast weight (62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the vibratory cylinder of Dubois in the rig of Bouyoucos et al. This would be done because it is simple and lightweight and allows the use of air instead of hydraulic power.

5. Claims 1, 2, 5-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancini et al. 5,209,564 in view of Bouyoucos et al. 6,378,951. Mancini et al. discloses (figure 2) discloses

Art Unit: 3672

an apparatus for generating sinusoidal pressure waves for application to a mandrel. The apparatus includes a cylinder (40a) including a chamber that has a bore (43), a 360° inlet gallery (46) and two exhaust galleries (52,54). There is a work piston (67) adapted to have reciprocal movement in the bore of the chamber and having a radial wall that will seal against the wall of the bore of the chamber during its reciprocal movement within the chamber. The work piston has a first land (top of 67) at one end of the work piston and a second land (bottom of 67) at the second end of the work piston. There are fluid channels (49,50) to alternately duct fluid under pressure from the inlet gallery into the bore of the cylinder above the first land of the work piston and be exhausted from the bore below the second land of the piston into the exhaust gallery to move the work piston within the bore, and to duct fluid under pressure from the inlet gallery into the bore of the cylinder below the second land of the work piston and be exhausted from the bore above the first land of the piston into the exhaust gallery to reciprocate the piston within the bore. The inlet gallery of the piston has an inlet port to enable pressurized fluid to enter the gallery. The inlet gallery communicating with the bore of the cylinder through a port that terminates at the surface of the wall of the bore. The body of the work piston has a first and second transfer gallery (49,50) extending longitudinally through the body and communicating through the radial wall of the work piston with said inlet gallery for a predetermined time during the reciprocating movement of the work piston. They also communicate with the bore of the cylinder through the first and second radial faces of the work piston. The chamber includes two exhaust galleries (52,54). The first exhaust gallery communicates with the cylinder chamber above the first radial face of the work piston. The second exhaust gallery communicates with the bore of the cylinder below the second radial face of the work piston. The first and second exhaust galleries include

outlet ports to enable fluid within the galleries to be ducted away from the bore of the cylinder. The location of the opening of the first transfer gallery in the radial wall of the work piston is offset longitudinally to the opening of the second transfer gallery in the radial wall of the work piston.

Manci et al. does not disclose a piston shaft connected to the work piston and adapted to transmit the forces generated by the reciprocating motion of the piston to a mandrel. Nor does it disclose that a rig supports the cylinder and the work piston includes a piston shaft which is connectable to the mandrel. Nor does it disclose that the cylinder chamber forms part of a drill head that includes a ballast weight.

Bouyoucos et al. (figure 6) discloses an apparatus for generating sinusoidal pressure waves for application to a mandrel (66). The apparatus includes a cylinder (64) including a chamber which has a bore (68,70). There is a work piston (62) adapted to have reciprocal movement in the bore of the chamber and having a radial wall which will seal against the wall of the bore of the chamber during its reciprocal movement within the chamber. The work piston has a first land at one end of the work piston and a second land at the second end of the work piston. There is a piston shaft connected to the work piston and adapted to transmit the forces generated by the reciprocating motion of the piston to a mandrel (66). A rig (60) supports the cylinder. The cylinder chamber forms part of a drill head that includes a ballast weight (62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the vibratory cylinder of Manci et al. in the rig of Bouyoucos et al. This would be done because it is simple and lightweight and allows the use of air instead of hydraulic power.

Art Unit: 3672

6. Claims 1, 2, 5-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over DuBois 5,806,608 in view of Barrow 5,549,170. DuBois discloses (figures 5,6) discloses an apparatus for generating sinusoidal pressure waves for application to a mandrel. The apparatus includes a cylinder (32) including a chamber that has a bore (44), a 360° inlet gallery (48) and two exhaust galleries (50,52). There is a work piston (24) adapted to have reciprocal movement in the bore of the chamber and having a radial wall that will seal against the wall of the bore of the chamber during its reciprocal movement within the chamber. The work piston has a first land (top of 24) at one end of the work piston and a second land (bottom of 24) at the second end of the work piston. There are fluid channels (66, 64) to alternately duct fluid under pressure from the inlet gallery into the bore of the cylinder above the first land of the work piston and be exhausted from the bore below the second land of the piston into the exhaust gallery to move the work piston within the bore, and to duct fluid under pressure from the inlet gallery into the bore of the cylinder below the second land of the work piston and be exhausted from the bore above the first land of the piston into the exhaust gallery to reciprocate the piston within the bore. The inlet gallery of the piston has an inlet port to enable pressurized fluid to enter the gallery. The inlet gallery communicating with the bore of the cylinder through a port (41) that terminates at the surface of the wall of the bore. The body of the work piston has a first and second transfer gallery (68, 72) extending longitudinally through the body and communicating through the radial wall of the work piston with said inlet gallery for a predetermined time during the reciprocating movement of the work piston. They also communicate with the bore of the cylinder through the first and second radial faces of the work piston. The chamber includes two exhaust galleries (50,52). The first exhaust gallery communicates with the cylinder chamber above the first radial



Art Unit: 3672

face of the work piston. The second exhaust gallery communicates with the bore of the cylinder below the second radial face of the work piston. The first and second exhaust galleries include outlet ports to enable fluid within the galleries to be ducted away from the bore of the cylinder. The location of the opening of the first transfer gallery in the radial wall of the work piston is offset longitudinally to the opening of the second transfer gallery in the radial wall of the work piston.

Dubois does not disclose a piston shaft connected to the work piston and adapted to transmit the forces generated by the reciprocating motion of the piston to a mandrel. Nor does it disclose that a rig supports the cylinder and the work piston includes a piston shaft which is connectable to the mandrel. Nor does it disclose that the cylinder chamber forms part of a drill head that includes a ballast weight.

Barrow (figures 1 and 7) discloses a sonic drilling rig. It includes a reciprocating piston (11) that transfers force/motion to a piston (38) connected to a mandrel (18). There is rig (6) supporting the sonic/vibratory apparatus (58). There is an air spring (28) that is broadly read as a ballast weight since it adds weight to the drill.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the vibratory cylinder of Dubois in the rig of Barrow et al. This would be done because it is simple and lightweight and allows the use of air instead of hydraulic power, and Barrow discloses that multiple sonic devices may be used to eliminate cuttings.

7. Claims 1, 2, 5-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancini et al. 5,209,564 in view of Barrow 5,549,170. Mancini et al. discloses (figure 2) discloses an apparatus for generating sinusoidal pressure waves for application to a mandrel. The apparatus

Art Unit: 3672

includes a cylinder (40a) including a chamber that has a bore (43), a 360° inlet gallery (46) and two exhaust galleries (52,54). There is a work piston (67) adapted to have reciprocal movement in the bore of the chamber and having a radial wall that will seal against the wall of the bore of the chamber during its reciprocal movement within the chamber. The work piston has a first land (top of 67) at one end of the work piston and a second land (bottom of 67) at the second end of the work piston. There are fluid channels (49,50) to alternately duct fluid under pressure from the inlet gallery into the bore of the cylinder above the first land of the work piston and be exhausted from the bore below the second land of the piston into the exhaust gallery to move the work piston within the bore, and to duct fluid under pressure from the inlet gallery into the bore of the cylinder below the second land of the work piston and be exhausted from the bore above the first land of the piston into the exhaust gallery to reciprocate the piston within the bore. The inlet gallery of the piston has an inlet port to enable pressurized fluid to enter the gallery. The inlet gallery communicating with the bore of the cylinder through a port that terminates at the surface of the wall of the bore. The body of the work piston has a first and second transfer gallery (49,50) extending longitudinally through the body and communicating through the radial wall of the work piston with said inlet gallery for a predetermined time during the reciprocating movement of the work piston. They also communicate with the bore of the cylinder through the first and second radial faces of the work piston. The chamber includes two exhaust galleries (52,54). The first exhaust gallery communicates with the cylinder chamber above the first radial face of the work piston. The second exhaust gallery communicates with the bore of the cylinder below the second radial face of the work piston. The first and second exhaust galleries include outlet ports to enable fluid within the galleries to be ducted away from the bore of the cylinder.

Art Unit: 3672

The location of the opening of the first transfer gallery in the radial wall of the work piston is offset longitudinally to the opening of the second transfer gallery in the radial wall of the work piston.

Manci et al. does not disclose a piston shaft connected to the work piston and adapted to transmit the forces generated by the reciprocating motion of the piston to a mandrel. Nor does it disclose that a rig supports the cylinder and the work piston includes a piston shaft which is connectable to the mandrel. Nor does it disclose that the cylinder chamber forms part of a drill head that includes a ballast weight.

Barrow (figures 1 and 7) discloses a sonic drilling rig. It includes a reciprocating piston (11) that transfers force/motion to a piston (38) connected to a mandrel (18). There is rig (6) supporting the sonic/vibratory apparatus (58). There is an air spring (28) that is broadly read as a ballast weight since it adds weight to the drill.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the vibratory cylinder of Dubois in the rig of Barrow et al. This would be done because it is simple and lightweight and allows the use of air instead of hydraulic power, and Barrow discloses that multiple sonic devices may be used to eliminate cuttings.

***Allowable Subject Matter***

8. Claims 3 and 4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


*Conclusion*

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Swanson '060 and '962, Leibundgut, Kanning, Shinohara et al. and Boguth all show similar features to the claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel P. Stephenson whose telephone number is (571) 272-7035. The examiner can normally be reached on 8:30 - 5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David J. Bagnell can be reached on (571) 272-6999. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
David Bagnell  
Supervisory Patent Examiner  
Art Unit 3672

DPS 